

WHAT IS CLAIMED IS:

1. A perpendicular magnetic recording medium comprising:

a substrate;

5 an underlayer formed on the substrate, and containing at least one element selected from the group A consisting of Pt, Pd, Rh, Ag, Au, Ir and Fe, and at least one element or compound selected from the group B consisting of C, Ta, Mo, W, Nb, Zr, Hf, V, Mg, Al, Zn,  
10 Sn, In, Bi, Pb, Cd, SiO<sub>2</sub>, MgO, Al<sub>2</sub>O<sub>3</sub>, TaC, TiC, TaN, TiN, B<sub>2</sub>O<sub>3</sub>, ZrO<sub>2</sub>, In<sub>2</sub>O<sub>3</sub> and SnO<sub>2</sub>; and

a magnetic layer formed on the underlayer, containing at least one element selected from the group consisting of Fe, Co and Ni, and at least one element  
15 selected from the group consisting of Pt, Pd, Au and Ir, and containing crystal grains having an L1<sub>0</sub> structure.

2. The medium according to claim 1, wherein the crystal grains having the L1<sub>0</sub> structure in the magnetic  
20 layer are mainly {001}-oriented.

3. The medium according to claim 1, wherein crystal grains in the underlayer are mainly {100}-oriented.

4. The medium according to claim 1, wherein the  
25 underlayer contains at least one element or compound selected from the group B within a range from 0.1 mol% to 50 mol%.

5. The medium according to claim 1, wherein the magnetic layer contains at least one element or compound selected from the group B.

5 6. The medium according to claim 5, wherein the magnetic layer contains at least one element or compound selected from the group B within a range from 0.1 mol% to 40 mol%.

10 7. The medium according to claim 1, further comprising a seed layer between the substrate and the underlayer.

8. The medium according to claim 1, further comprising a crystal orientation layer between the substrate and the underlayer.

15 9. The medium according to claim 8, wherein the crystal orientation layer containing Cr and at least one element selected from the group C consisting of Ti, Ni, Co, Cu and Zn.

20 10. A medium according to claim 9, wherein the crystal orientation layer contains at least one element selected from the group C within a range from 0.1 mol% to 50 mol%.

11. The medium according to claim 8, further comprising a seed layer between the substrate and the crystal orientation layer.

25 12. The medium according to claim 1, wherein the magnetic layer has a thickness of 200 nm or less.

13. The medium according to claim 12, wherein the

magnetic layer has a thickness ranging from 0.5 nm to 50 nm.

14. The medium according to claim 1, further comprising a protective layer on the magnetic layer.